BLUE MOUNTAIN INTERAGENCY
FIRE DANGER OPERATING PLAN

USFS National Forests: Malheur, Umatilla, Wallowa-Whitman
Oregon Department of Forestry Units: John Day, LaGrande, Pendleton, Wallowa
Bureau of Land Management: portions of: Burns, Prineville, and Vale Districts
Washington Department of Natural Resources: portions of Southeast Region

2011 Plan Approval

This Fire Danger Operating Plan is approved and will remain in effect until rescinded or revised.

Fire Staff Officer - USFS, Malheur NF	4/7/2011 Date
Fire Staff Officer - USFS, Umatilla NF	4/7/2011 Date
Fire Staff Officer - USFS, Wallowa-Whitman NF	4/7/2011 Date
District Forester - ODF, Northeast Oregon District	4/7/2011 Date
District Forester - ODF, Central Oregon District	4/8/11 Date
Fire Program District Manager WA DNR, Southeast Region	4/21/11 Date

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I. INTRODUCTION

This plan documents an operational planning and decision-making process for agency administrators, fire managers, dispatchers, and firefighters based on the best available scientific methods and historical fire/weather analysis. The plan is a work-in-progress and should be reviewed and updated as needed.

This plan encompasses an area of approximately 10.4 million acres in Northeast Oregon and Southeast Washington. Agencies with wildfire protection responsibilities covered by this plan include:

- USFS, Malheur National Forest (MAF)
- USFS, Umatilla National Forest (UMF)
- USFS, Wallowa-Whitman National Forest (WWF)
- ODF, Northeast Oregon District (NEO)
- ODF, Central Oregon District, John Day Unit (COD)
- WA DNR, portions of Southeast Region (WA DNR)

Guidance and policy for development of a Fire Danger Operating Plan can be found in the Interagency Standards for Fire & Aviation Operations (Red Book), Wildland Fire and Aviation Program and Management and Operation Guide (Blue Book), and Forest Service Manual (FSM) 5120.

The process used to develop this plan is consistent with what is taught in the National Wildfire Coordinating Group (NWCG) courses:

- S491 - Intermediate National Fire Danger Rating System (NFDRS), and
- Advanced NFDRS (taught at National Advance Fire and Resource Institute).

The process generally involves:

1. Acquire and quality control historic fire history and weather data.
2. Delineate fire danger rating areas (FDRA) based on vegetation, climate, and topography.
3. Assign historic fire history and weather data to fire danger rating areas.
4. Perform analysis for statistical correlation of historic fire occurrence with historic NFDRS outputs by FDRA, and identify basis for future decisions.
5. Develop decision thresholds based on the NFDRS output and historic fire occurrence that best matches the intent of the decision.
6. Document the analysis, operation, communication, maintenance, and re-evaluation process in a Fire Danger Operating Plan.

II. PURPOSE

This plan is intended to guide fire danger/preparedness decisions for the agencies signatory to the plan. It is the intent of fire managers and agency administrators to have a coordinated approach to fire danger/preparedness decisions across the Blue Mountains, recognizing that a coordinated approach may limit some individual unit flexibility, but is likely to provide consistent information to the public, cooperators, agency employees, and firefighters.

III. ROLES AND RESPONSIBILITIES

A. Fire Weather Program

Weather forecasts and products for the Blue Mountain area are provided by the National Weather Service, Pendleton, OR office. The annual Fire Weather Operating Plan with contact information and product listing (including NFDRS point and trend forecast products) can be found at:
http://www.wrh.noaa.gov/firewx/tablinks.php?wfo=pdt&tab=admin

B. Fire Danger Technical Group

Each participating agency will be responsible for providing an NFDRS technical specialist to participate in the maintenance, review, and update of this plan. The following are specific individuals by agency or Dispatch Center:

- For USFS, UMF it will be Brian Goff.
- For USFS, WWF it will be Willy Crippen.
- For USFS, MAF it will be Brian Sines.
- For ODF NEO it will be Dennis Perilli.
- For ODF, John Day Unit it will be Boone Zimmerlee.
- For WA DNR it will be Jim Munroe.
- For BMIDC it will be Jerry Garrett.
- For JDIDC it will be Theresa Youmans.

Members of the Fire Danger Technical Group will monitor NFDRS to ensure validity, coordinate/communiate any problems identified, review plan implementation, coordinate plan revisions, present the plan, and be available for NFDRS technical consultation. Some specific elements to monitor and coordinate are ensuring observations are selected appropriately (time, SOW, wet flag, consistent), station management in WIMS (herb state, catalog), station maintenance (instrument errors, transmit times), station siting (eliminate redundant/inappropriate, propose new sites where appropriate).

The technical group will coordinate with fire managers from their unit for updates and additions to the plan. The technical group will meet annually to review plan implementation, decide if revisions are necessary, and accomplish revisions.

C. Fire Weather Station Responsibility

Following is the list of personnel responsible for maintenance of weather stations in the plan area:

- For USFS WWF, it will be Russ Hurst.
- For USFS MAF, it will be James Smarr.
- For USFS UMF it will be Steve Garza.
- For ODF it will be Nick Yonker.

The station owner is the contact for all issues regarding station management in WIMS and station maintenance for stations under their control. See Appendix G for the dispatch office to contact regarding station owner.

D. Dispatch Center

Blue Mountain Interagency Dispatch Center (BMIDC) and John Day Interagency Dispatch Center (JDIDC) personnel are responsible for entering observations daily in WIMS for stations in their area, updating the NFDRS tracking workbook, and communicating outputs (i.e. phone, web, radio).

E. Field Operations Managers

USFS District Fire Management Officers (DFMOs)/ODF Unit Foresters and their assistants will assure that their personnel understand NFDRS outputs and how they are to be used. Field Operation Managers are responsible for implementing this plan, and ensuring decisions are made consistent with the intent of the plan.

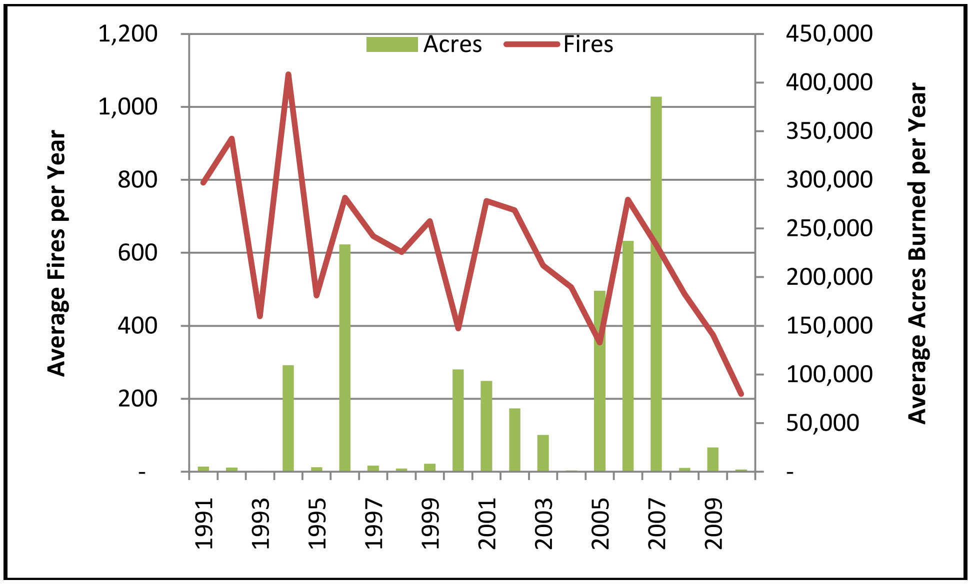
F. Program Managers/Agency Administrators

USFS Forest Fire Staff Officers and Forest Supervisors, ODF District Foresters, and WA DNR Fire Program District Manager will use this Fire Danger Operating Plan and NFDRS outputs as a tool to coordinate and to make informed fire related decisions. The program manager/agency administrator is ultimately responsible for ensuring this plan is maintained, utilized, and communicated.

IV. FIRE DANGER RATING INVENTORY

A. Fire Activity/History

The Blue Mountain area has a heavy wildfire load both in numbers of fires and size of fires. There is an average of 605 fires per year with an average annual acreage burned of 75,924 acres for the combined wildland fire agencies in the Blue Mountain area. The minimum number of fires in a year was 213 in 2010, and the minimum acres burned in a year were 800 in 1993. The maximum number of fires in a year was 1,089 in 1994, and the maximum acres burned in a year were 385,321 in 2007.



The majority (80%) of fires occur July through September. Approximately 75% of fires are caused by lightning. Approximately 93% of fires indicate a final size of 1 acre or less. A detailed set of graphs of fire business is available in Appendix D.

To develop the combined fire history for all wildland agencies in the Blue Mountain area, historical fire origin points and report information from each agency were combined into a single database and manipulated to a common format. Agency cause codes were converted to ensure consistent reporting of fire causes (see crosswalk in Appendix D). Fires with obvious errors in either data or location were eliminated. Duplicate fires where more than one agency reported the same fire were eliminated where possible, especially for fires larger than 5-10 acres. Fire points were assigned a fire danger rating area based on the location of the fire origin. A description of how the interagency fire history for the Blue Mountains area was acquired, quality control checked, duplicates and erroneous data eliminated, and the results of how many fires by agency were utilized in the analysis is located under Appendix D.

B. Weather Stations

There are 24 permanent Remote Automated Weather Stations (RAWS) in the Blue Mountains area. A table of the RAWS as well as a description of each RAWS is included in Appendix G.

A quality control process was developed and utilized on 20 RAWS, producing the most consistent, least erroneous historic weather data available. A report of the quality control process and results is included in Appendix E. Four stations (Minam Lodge, LaGrande 1, Mitchell, Fall Mtn) were not used due to poor historic data, missing data, instrument errors, or short record history.

In general, the quality control processing involved; obtaining unprocessed historic weather data for each station from the Western Region Climate Center (WRCC), removing erroneous and inappropriate readings, estimating missing readings where appropriate, calculating daily summaries, consistently selecting daily observations, and writing data into a format compatible with fire analysis software. Descriptions by RAWS of weather data quality and a comparison of the quality control weather data to NIFMID weather data is available.

The fire danger rating area map exhibits RAWS locations, a table displaying a summary of RAWS utilized and quality control data results is included in Appendix E.

C. Fire Danger Rating Areas

A fire danger rating area (FDRA) is defined as: "A geographic area relatively homogenous in climate, fuels and topography, tens of thousands of acres in size, within which the fire danger can be assumed to be uniform. Its size and shape is primarily based on influences of fire danger, not political boundaries. It is the basic on-the-ground unit for which unique fire management decisions are made based on fire danger ratings. Weather is represented by one or more NFDRS weather stations." (NWCG Fire Danger Working Team. 2002. Gaining an Understanding of the National Fire Danger Rating System. NWCG, PMS 932, Boise, Idaho. 72 pp.)

A comprehensive analysis of the Blue Mountain area was conducted using Geographic Information Systems (GIS) programs and data. All of the data sources utilized were developed consistently across the entire area, not unique by ownership.

The primary data utilized includes Digital Elevation Model (DEM), EPA Level IV Ecoregions, Oregon and Washington GAP Vegetation, and climate data produced by Oregon Climate Services and distributed by The Climate Source (CSI). Climate data included average monthly (for the period 1960-1991): Maximum Temperature, Average Temperature, Minimum Temperature, Relative Humidity, and Precipitation.

A series of meetings were conducted with Blue Mountain area fire managers to get input on what locations were different enough from other locations to possibly warrant a different fire danger related decision. A discussion of what the differences were led to utilizing data (vegetation, climate, or topography) that displayed the difference.

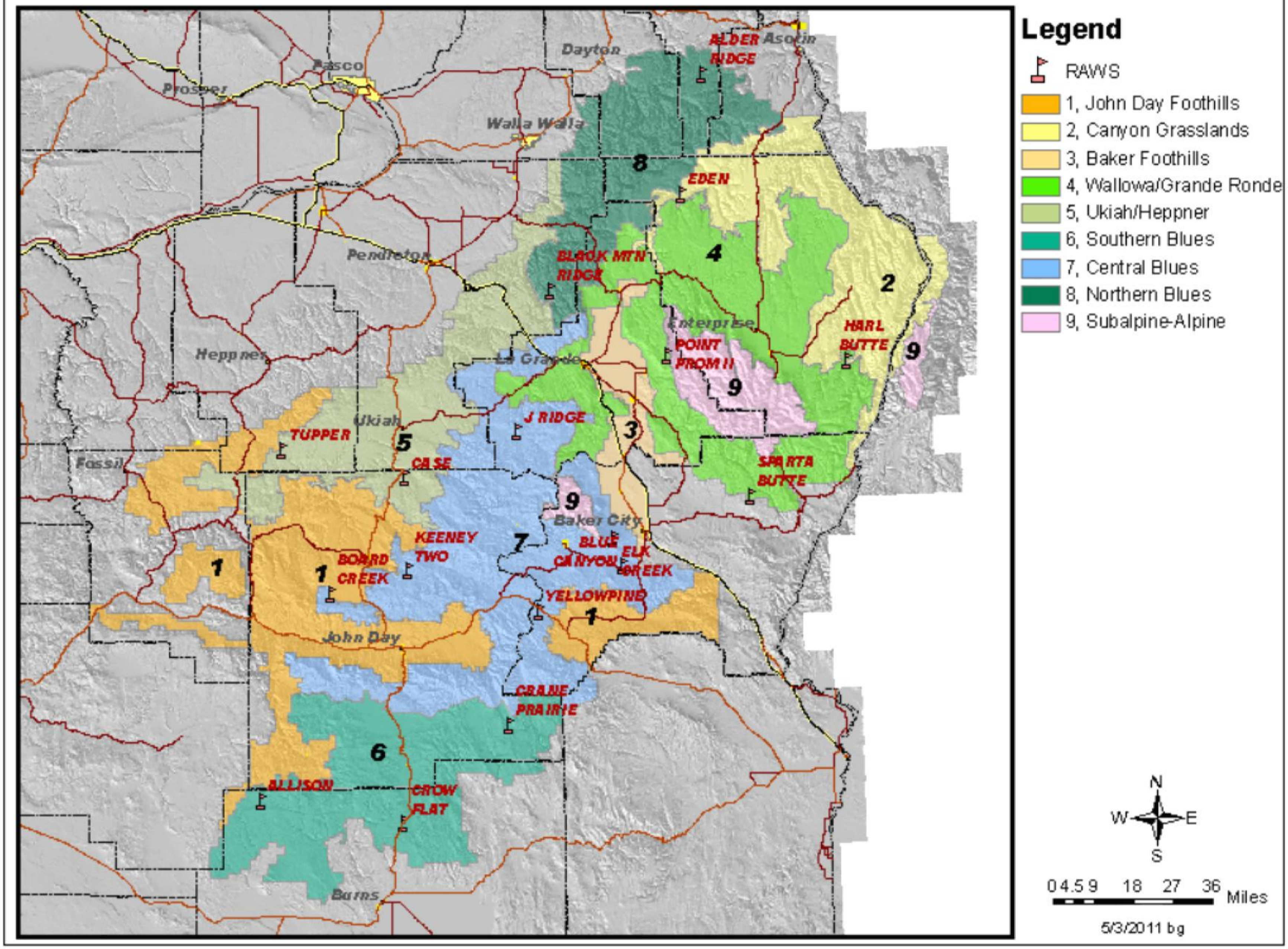
Nine fire danger rating area's were delineated. The contribution of fuels, or weather, or topography was weighed as to which would have the greatest effect on wildfire. Following is a table with descriptive parameters:

			ELEVATION (FT)			
FDRA	Description	Acres	MEAN	MIN	MAX	RANGE
1	John Day Foothills	1,880,713	4,045	1,814	6,867	5,053
2	Canyon Grasslands	1,038,365	3,705	796	6,979	6,183
3	Baker Foothills	331,034	3,205	1,801	4,931	3,130
4	Wallowa/Grande Ronde Foothills	1,616,193	4,406	1,939	8,652	6,713
5	Ukiah/Heppner	1,055,237	3,905	1,380	6,201	4,821
6	Southern Blues	1,219,994	5,251	3,514	7,166	3,652
7	Central Blues	1,881,646	5,229	2,996	9,039	6,043
8	Northern Blues	936,427	4,136	1,653	6,379	4,726
9	Subalpine-Alpine	474,569	6,781	2,894	9,813	6,919
		10,434,180				

Initially the fire danger rating areas were delineated by combining polygons of the GAP vegetation data, where it made sense based on vegetation, climate, and topography. The boundaries between the FDRAs were not very smooth, especially where boundaries were in areas with considerable variation in topography. FDRA boundaries were smoothed by basing the polygons on groups of EPA Level IV ecoregions consistent with homogenous areas of vegetation, climate, and topography.

Where FDRA boundaries were close to administrative boundaries, or boundaries easier to define for administrative purposes, the FDRA boundaries were moved. In some cases the FDRA boundary was moved for administrative purposes, not necessarily consistent with vegetation, climate, and topography; such as putting all of LaGrande Ranger District into FDRA 7.

BLUE MOUNTAIN FIRE DANGER RATING AREAS and RAWS

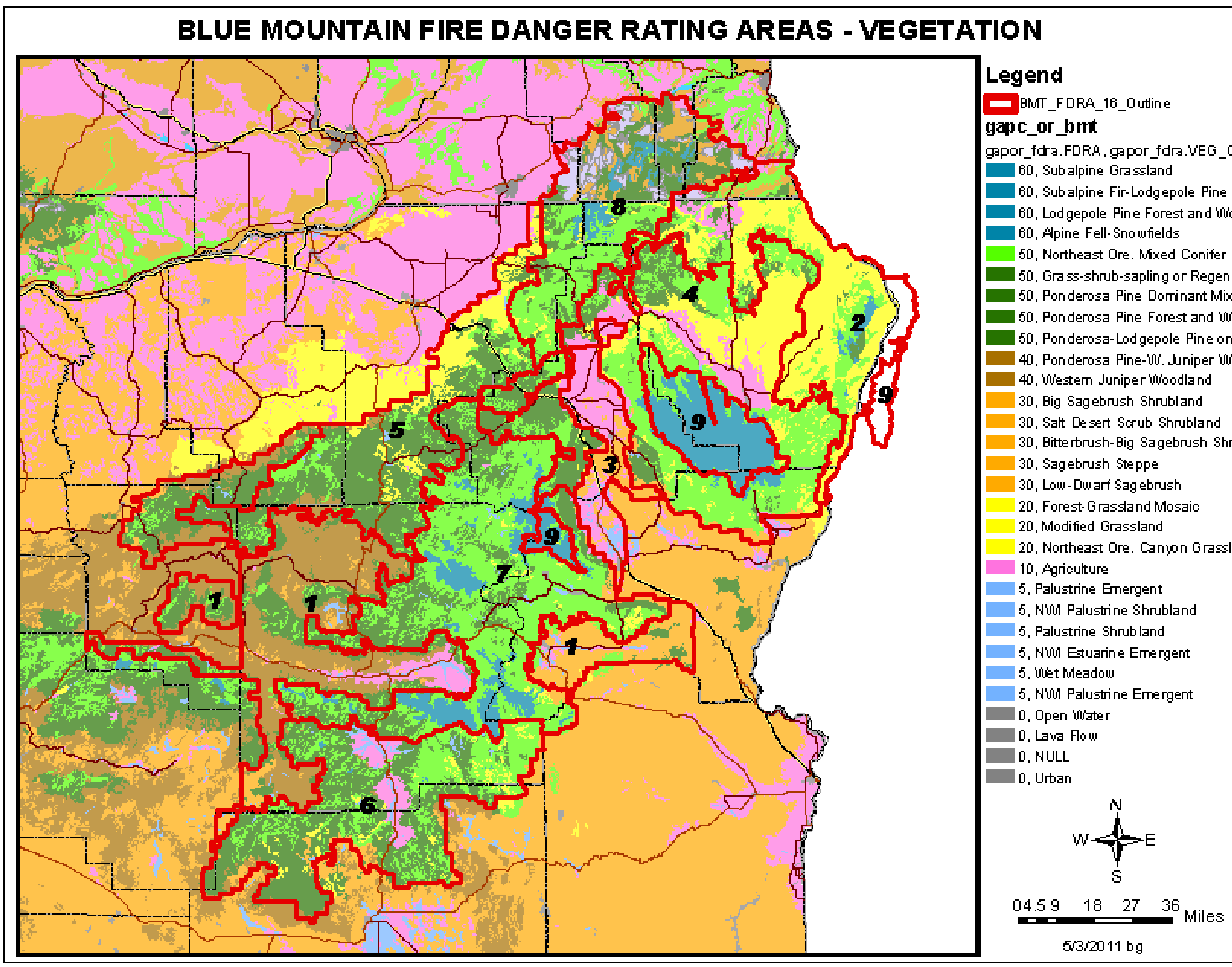


1. Vegetation

Following is a map with GAP vegetation, polygons are shaded generally as follows:

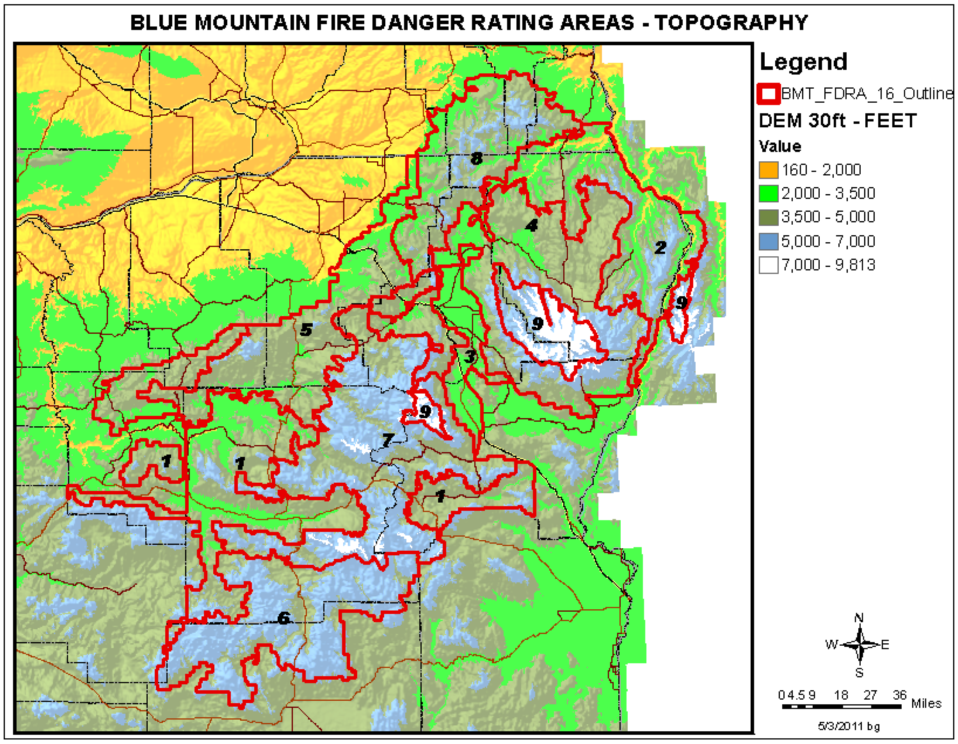
- Pink – agriculture
- Yellow – grasslands
- Orange – shrub/sage
- Brown – juniper
- Light green – dry forest (i.e. Ponderosa Pine)
- Dark green – moist forest (mixed conifer, fir)
- Blue – alpine, subalpine

Generally vegetation was delineated based on these categories, where vegetation occupied a large enough area to possibly warrant a different fire danger decision than adjacent areas.

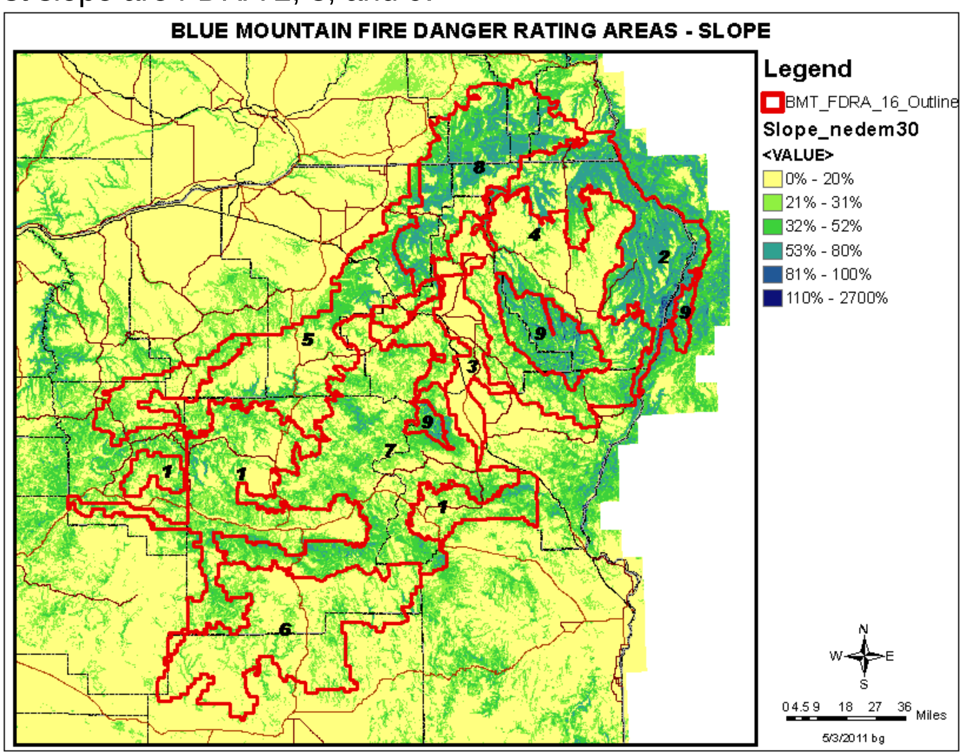


2. Topography – Based on 30m Digital Elevation Model (DEM) data.

The following map shows elevation divided into 5 bands. FDRA 9 is generally the highest elevations (subalpine, alpine), and FDRAs 1, 2, and 3 are generally the lowest.

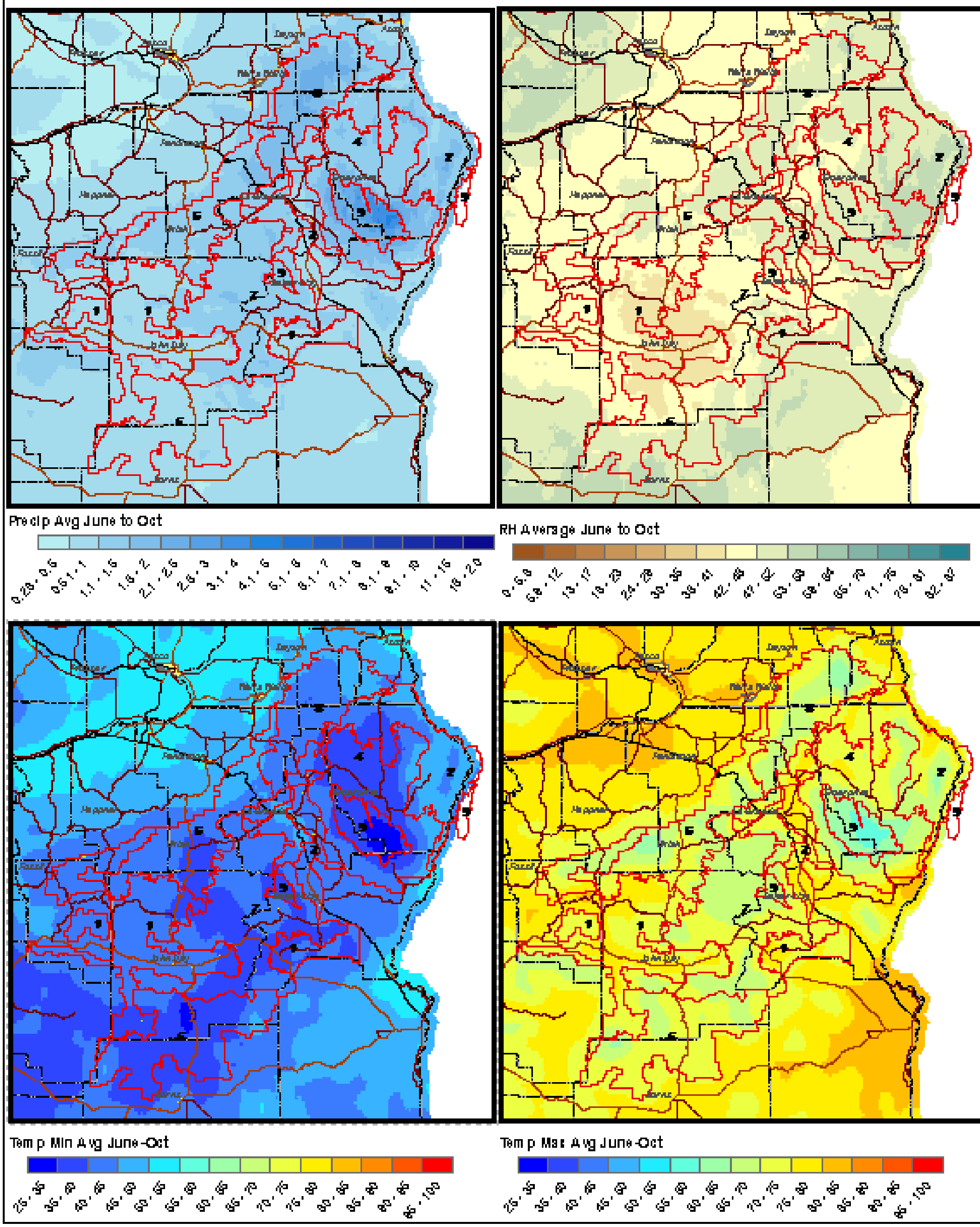


Some of the largest elevation changes occur in FDRA 2, 4, and 9. The following map displays the area slope classes, based on percent slope. Areas with the most and greatest slope are FDRA 2, 8, and 9.



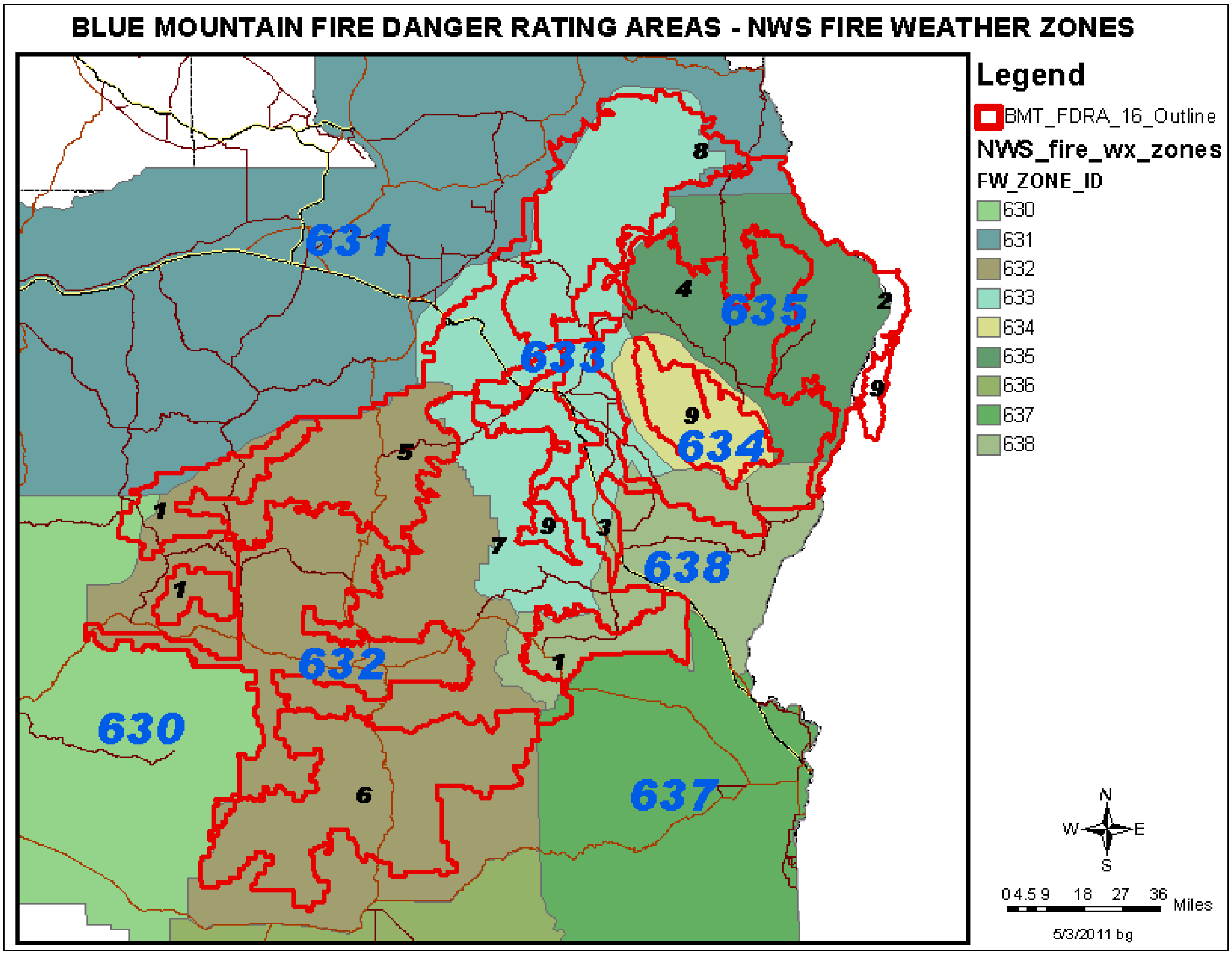
3. Climatology – Based on Oregon Climate Services 1960-1991 average monthly climate data, averaged by fire season – June through October.

BLUE MOUNTAIN FIRE DANGER RATING AREAS - CLIMATE



D. Fire Weather Forecast Zones

National Weather Service, Pendleton office, Fire Weather Forecast Zones are shown in the following map.



V. FIRE-DANGER INDEXES AND FIRE BUSINESS ANALYSIS

A. FireFamily Plus Correlations/Analysis.

The following parameters and variables were used to set up each of the analysis runs: Within a FDRA, run all weather stations and special interest group (SIG – a group of stations) that make sense – some stations are not compatible to put into SIGS, others may limit the data years available to analyze.

- Fire Season (base): use June 1 – October 31.
- Data Years: use 20 years when available, 1991-2010, if less than 20 years available, use all available years.
- Analysis Period Length: 1 day
- Greenup Date: use 5/15
- Freeze Date: use 9/15
- Fire Cause: use all causes (both lightning & human cause)
- Large Fire Day: see table Appendix F
- Multiple Fire Day: see table Appendix F
- Fuel Models: run fuel models C, G, H, K, T, U
- Variables: use dry bulb temperature, relative humidity, SC, ERC, BI, IC, 10hr, 100hr, 1000hr (temp, rh, 10, 100, 1000 hr are not fuel model dependent)

Save all 4 indices for all 6 fuel models for each station/SIG run and save temp, rh, 10, 100, and 1000 hour fuel moistures for each station/SIG run - there should be 29 saved runs for each station/SIG in a FDRA. A total of 1,372 statistical analysis runs were made for the nine fire danger rating areas (FDRA) in the analysis.

B. Adjective Fire Danger Rating Definitions and Analysis

The following table describes how fire business was used to indicate thresholds for adjective fire danger. The column on the right is copied out of “Gaining an Understanding of the National Fire Danger Rating System” and is considered the national standard. The column in the middle describes where fire business thresholds were identified as a result of the analysis and utilized in this plan. This plan does not use “VERY HIGH” because the majority of agencies involved in this plan currently use a four level system, some have signs that will only work with four levels.

ERC was selected because it is relatively stable, displays a seasonal trend, and is indicative of high resistance to control fires.

Energy Release Component (ERC) does not include wind in calculation of the index and is heavily weighted to large fuel moistures. ERC displays the cumulative effect of weather on large fuels over time, a seasonal trend. Large fuel moistures are a key factor in fire intensity and contribute to fires having a high resistance to control.

Fire Danger Rating and Color Code	Blue Mountain Plan ADJECTIVE CLASS USED	NWCG Recommended Adjective Class Description
Low (L) (Green)	**Historically there have been few fires at this range of index values.**	Fuels do not ignite readily from small firebrands although a more intense heat source, such as lightning, may start fires in duff or punky wood. Fires in open cured grasslands may burn freely a few hours after rain, but woods fires spread slowly by creeping or smoldering, and burn in irregular fingers. There is little danger of spotting.
Moderate (M) (Blue)	**Historically fires have occurred during this range of index values, but few large fires (as defined in the analysis) have occurred.**	Fires can start from most accidental causes, but with the exception of lightning fires in some areas, the number of starts is generally low. Fires in open cured grasslands will burn briskly and spread rapidly on windy days. Timber fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel, especially draped fuel, may burn hot.
High (H) (Yellow)	**Historically large fires have occurred during this range of index values. There is less probability of high intensity, high resistance to control fires than in the Extreme category. Large fires during this range of index values are most related to fine fuels.**	All fine dead fuels ignite readily and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly and short-distance spotting is common. High-intensity burning may develop on slopes or in concentrations of fine fuels. Fires may become serious and their control difficult unless they are attacked successfully while small.
Very High (VH) (Orange)	Not Used	Fires start easily from all causes and, immediately after ignition, spread rapidly, and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high intensity characteristics such as long-distance spotting and fire whirlwinds when they burn into heavier fuels.
Extreme (E) (Red)	**Historically large fires have occurred at a higher rate than during the High range of index values. Large fires have a higher resistance to control due to greater intensity, more fuel (large and live fuels) participating in the fire due to all components of fuel being more available to burn.**	Fires start quickly, spread furiously, and burn intensely. All fires are potentially serious. Development into high intensity burning will usually be faster and occur from smaller fires than in the very high fire danger class. Direct attack is rarely possible and may be dangerous except immediately after ignition. Fires that develop headway in heavy slash or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions the only effective and safe control action is on the flanks until the weather changes or the fuel supply lessens.

C. Dispatch Level Analysis

The following table describes how fire business was used to indicate thresholds for dispatch decisions. The intent was to identify categories at which fire business would be different, and would tend to require different resource mixes and tactic considerations to successfully control the fire. A Burning Index (BI) for a fuel model G was used to set dispatch levels.

The Burning Index is a combination of Energy Release Component (ERC) and Spread Component (SC). ERC does not include wind in calculation of the index and is heavily weighted to large fuel moistures. SC is very sensitive to wind and is weighted to fine fuel moistures. The BI can fluctuate from day to day, but does tend to have an underlying seasonal trend. Fires can occur at a BI of 0, but would have little spread potential as long as conditions on the fire were similar to conditions at the weather station where the index value was computed from.

BI was selected because it considers wind and is indicative of initial attack fire business, both with daily fluctuations in fine fuels and wind, and in the seasonal trend and potential for high resistance to control fires. A forecasted index value, available in the afternoon, will be used to set dispatch levels for the next day.

Dispatch Level Color	Blue Mountain Plan Analysis
Green	Historically few fires (as defined in the analysis) have occurred.
Blue	Historically fires have occurred during this range of index values, but few large fires (as defined in the analysis) have occurred.
Yellow	Historically large fires have occurred during this range of index values. There is less probability of high intensity, high resistance to control fires than in the Extreme category. Large fires during this range of index values are most related to fine fuels.
Red	Historically large fires have occurred at a higher rate than during the High range of index values. Large fires have a higher resistance to control due to greater fire intensity resulting from more fuel being available (dry) and participating in the fire.

VI. FIRE-DANGER BASED DECISIONS/PRODUCTS

A. Seasonal Fire Danger Tracking

1. Seasonal Chart

   A Microsoft Excel workbook has been developed which includes an automated process to import data exported from the Weather Information Management System (WIMS), post the data to appropriate worksheets, and automatically update numerous charts for display. Adjective class charts in the workbook can be used to easily see, and to easily communicate, current season tracking. Data Select charts in the workbook, and the station worksheets, can be used for validation of model outputs and station inputs.

2. Fire Danger Pocket Card for Firefighter Safety

   There is one PocketCard for all nine FDRAs comprising the Blue Mountain area. The PocketCard is two-sided on an 8½"x11" page that includes nine charts, one for each FDRA. The PocketCard is posted on the NWCG, Fire Danger Working Team, Pocket Card website at: http://famweb.nwcg.gov/pocketcards/default.htm

B. Daily Staffing Levels

1. Personnel and Initial Attack Resources

   Staffing levels are currently determined by agency/unit.

2. Aircraft – detection

   Detection aircraft and aerial observer(s) are utilized as needed and ordered by the agency/unit duty officer through dispatch. Fire danger levels can aide in identifying conditions and areas at most risk for large fires, where aerial detection may be most beneficial following ignition events.

3. Lookouts

   Lookout staffing is determined by agency/unit.

C. Preplanned/Incident Dispatching

A coordinated dispatch level based on the fire danger system will be utilized by all agencies within the Blue Mountain area using a four level system described by colors, delineated by fire danger rating area, and tracked by dispatch centers. The dispatch level color categories indicate expected differences in fire business. As dispatch levels change, production capabilities of suppression resources should change. Specific resource to be dispatched will be addressed by each dispatch center.

For each fire danger rating area, the column on the left describes the dispatch level threshold value, the percent value on the right is the average number of days between June 1 and October 31, during the analysis period (mostly 1991-2010), that had a value within that range.

FDRA	1		2		3		4		5	
FDRA Name	John Day Foothills		Canyon Grasslands		Baker Foothills		Wallowa/Grande Ronde Foothills		Meacham-Ukiah-Heppner	
Station/SIG	BOARD CREEK		Harl-Eden 1:2		Yellowpine-Sparta		Harl-Sparta 2:1		Tupper-Case	
Index	BI	% Days	BI	% Days	BI	% Days	BI	% Days	BI	% Days
GREEN	0	18%	0	22%	0	7%	0	24%	0	23%
BLUE	27	30%	33	30%	27	13%	38	28%	32	26%
YELLOW	42	23%	49	30%	42	18%	55	26%	44	31%
RED	51	29%	64	18%	51	62%	70	22%	57	20%

FDRA	6		7		8		9	
FDRA Name	Southern Blues		Central Blues		Northern Blues		Subalpine	
Station/SIG	Crane-Allison-		J Ridge - Keeney		Black Mtn-Alder		ElkCrk-PtProm	
Index	BI	% Days	BI	% Days	BI	% Days	BI	% Days
GREEN	0	16%	0	25%	0	23%	0	33%
BLUE	29	29%	36	23%	31	30%	35	36%
YELLOW	41	36%	47	27%	45	25%	50	27%
RED	54	18%	58	25%	56	23%	65	3%

D. Public Fire Danger Signs – Adjective

A coordinated adjective fire danger system will be utilized by all agencies within the Blue Mountain area using a four level system displayed on signs throughout the area. Signs will be set based on adjective rating for the particular fire danger rating area best represented by the sign.

Signs will be changed when the observed ERC crosses a threshold for the particular fire danger rating area, and weather forecast trends indicate that the ERC is likely to remain above or below the current level for five or more days.

For each fire danger rating area, the column on the left describes the adjective class threshold value, the percent value on the right is the average number of days between June 1 and October 31, during the analysis period (mostly 1991-2010), that had a value within that range.

FDRA	1		2		3		4		5	
FDRA Name	John Day Foothills		Canyon Grasslands		Baker Foothills		Wallowa/Grande Ronde Foothills		Meacham-Ukiah-Heppner	
Station/SIG	BOARD CREEK		Harl-Eden 1:2		Yellowpine-Sparta		Harl-Sparta 2:1		Tupper-Case	
Index	ERC	% Days	ERC	% Days	ERC	% Days	ERC	% Days	ERC	% Days
LOW	0	21%	0	24%	0	11%	0	26%	0	21%
MODERATE	33	25%	36	23%	33	20%	36	27%	37	25%
HIGH	49	30%	50	32%	49	31%	52	27%	52	29%
EXTREME	65	24%	69	21%	65	38%	69	20%	68	24%

FDRA	6		7		8		9	
FDRA Name	Southern Blues		Central Blues		Northern Blues		Subalpine	
Station/SIG	Crane-Allison-Crow		J Ridge - Keeney - Blue		Black Mtn-Alder		ElkCrk-PtProm	
Index	ERC	% Days	ERC	% Days	ERC	% Days	ERC	% Days
LOW	0	17%	0	23%	0	27%	0	35%
MODERATE	33	34%	38	26%	36	24%	40	33%
HIGH	47	35%	53	29%	50	29%	60	17%
EXTREME	63	17%	68	22%	66	20%	70	15%

E. Public Use Restrictions/Closures

Determined by agency/unit.

F. Industrial Restrictions/Closures

Determined by agency/unit.

G. Severity

1. Season

   A brief methodology is described in “Interagency Standards for Fire and Fire Aviation Operations” (Red Book) within chapter 10, Preparedness.

2. Episode – Forecast Event Considerations

   a) Multiple ignitions such as forecast lightning, especially when not accompanied by precipitation – forecast as a Lightning Activity Level (LAL) of 6. Most thunderstorm events, forecast as LAL 2-5, are accompanied by precipitation, these episodes certainly increase the workload for initial attack modules but typically do not account for large fires. Forecast conditions for lightning episodes when the adjective class is High or dispatch level is Yellow or higher should prompt consideration for additional IA resources.

   b) Unstable atmospheric conditions (little resistance to vertical air movement) as indicated by a forecasted Haines Index of 5 or 6.

   c) Forecast high wind events along with dry fuel conditions.

   d) Prolonged low relative humidity events, such as provided by subsidence inversions.

   e) Ignition sources believed to be Arson.

H. Prescribed fire

I. Public News Releases

Public news releases related to fire danger should utilize information consistent with this Fire Danger Operating Plan.

VII. OPERATIONAL PROCEDURES

A. Seasonal Schedule

1. Station Initialization

   The dispatch center will coordinate with the station owner and Fire Danger Technical Group to set green-up. Annual cycle would be for stations to have the herb state at frozen during the winter. Approximately two weeks prior to the peak of greenness set the herb state to green to trigger green-up. This point would typically be about mid-May, with peak of green-up being early June. Normalized Difference in Vegetative Index (NDVI) imagery should be used to monitor greenness. Once a killing frost has occurred in the fall, the station herb state should be set to frozen. A killing frost involves several days with minimum temperatures at approximately 28 degrees or less, for several hours.

2. Station Catalog inputs in WIMS

   The station owner is responsible to ensure appropriate catalogs are tracked in WIMS; catalogs should be coordinated with the Fire Danger Technical Group.

B. Daily Schedule

Personnel at the Blue Mountain Interagency Dispatch Center (BMIDC) and the John Day Interagency Dispatch Center (JDIDC) will access WIMS daily and enter observations for stations in their respective dispatch area.

1. Quality Control Station Data

   Weather readings for the previous 24 hours will be checked by looking at hourly readings (DRAWS fastpath in WIMS) for abnormal or inappropriate readings, possibly indicating instrument errors.

2. Enter Observations

   All observations will be for the hourly weather record closest to 13:00 hours. For stations with transmit times more than :30 minutes after the hour, a 12 hour reading will be the observation time, all rest will be a 13 hour observation time. State of the Weather will be selected based on conditions at 14:00 hours (daylight savings time) for the majority of the fire danger rating area the station represents, not necessarily just the station. The Wet Flag will be set to “Y” when appropriate, as described in the latest WIMS Technote or Help Desk guidance. Tasks associated with selecting an observation should be accomplished by 15:00 hours each day, so that the observations will be available to the National Weather Service to enter trend forecasts, allowing forecasted indices to be available for the next day.

3. Fire Danger Chart

   DIDX and DOBS will be downloaded from WIMS daily after forecasted indices become available, then the Microsoft Excel Workbook for BMT_NFDRS_Tracking will be opened, the “Import_DIDX_DOBS” macro executed, automatically updating the workbook. Instructions will be stored with the Excel Workbook.

C. Large Fire Support

1. CD of local data
2. Seasonal Chart - Pocket Card – Posters

VIII. PROGRAM NEEDS

A. Weather Stations Sites

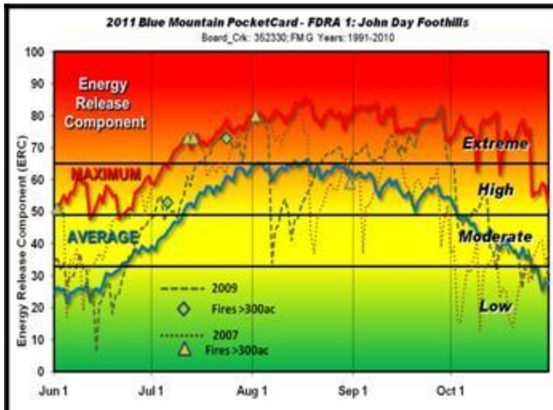
Weather station siting, maintenance, and data management is to be evaluated annually to ensure the stations are meeting the intent and needs of fire danger rating and weather forecasting.

B. Training

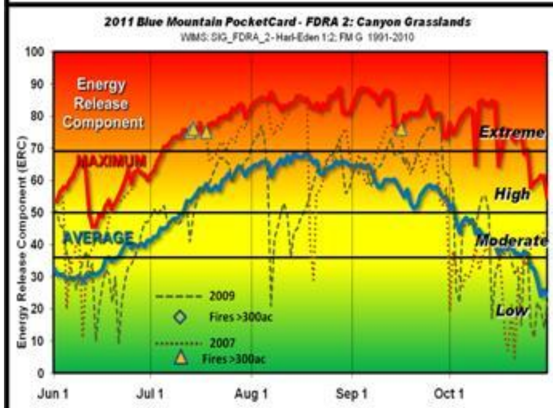
1. Fire Danger Technical Specialists - Development of Fire Danger Technical Specialists takes a number of years to become proficient. Developing technical specialists requires forethought so that they are available when needed.
2. Fire Managers – Interpreting NFDRS data appropriately and utilizing NFDRS to make decisions within a fire program requires some understanding of NFDRS. S-491 is recommended for all area fire managers.

IX. APPENDIX

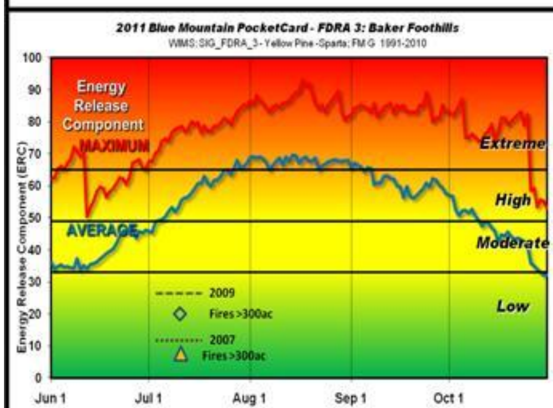
A. PocketCard – Front



FDRA 1
John Day Foothills



FDRA 2
Canyon Grasslands



FDRA 3
Baker Foothills

Blue Mountains Area
Fire Danger PocketCards - 2011

- 9 Fire Danger Rating Areas (FDRA)
- All 17 Weather Stations (RAWS) utilized meet NWCG Standards.

Fire Danger Interpretation:

⇒ **Moderate**— Historically few fires have occurred that grew to more than 20 acres.
⇒ **High**— Increased Fire Danger. Historically large fires have occurred during this range of index values
⇒ **Extreme**— Large Fire Threshold. Historically, the majority of fires that grew to more than 300 ac occurred when ERC was above this threshold.

Interpretation of Charts:

⇒ **Title**—Describes Fire Danger Rating Area chart applies to.
⇒ **Subtitle**—Identifies weather stations (RAWS) utilized, NFDRS fuel model, years analyzed, for that particular FDRA.
⇒ **MAXIMUM**—Highest ERC recorded for that day.
⇒ **AVERAGE**—Average ERC recorded for that day.
⇒ **Year** (2007 and 2009) are the ERC values recorded for that season.
⇒ **Fire>300**—Symbol identifies the day a fire was discovered that resulted in a fire that grew larger than 300 acres
⇒ **Fuel Model G**—Short Needle Conifer with Heavy Dead Down (FM10)

Remember what Fire Danger tells you:

☑ **Energy Release Component** (ERC) Indicates Fire Season Severity and trends in Fire Season. It is calculated from 2pm and 24hr min/max temp, 2pm and 24hr min/max relative humidity, and 24hr precipitation duration. (Wind is **NOT** part of ERC calculation)
☑ PAY ATTENTION to local conditions and variations across the landscape: **Fuel, Weather, and Topography**.
☑ LISTEN to weather forecasts and local weather readings—especially **WIND**.

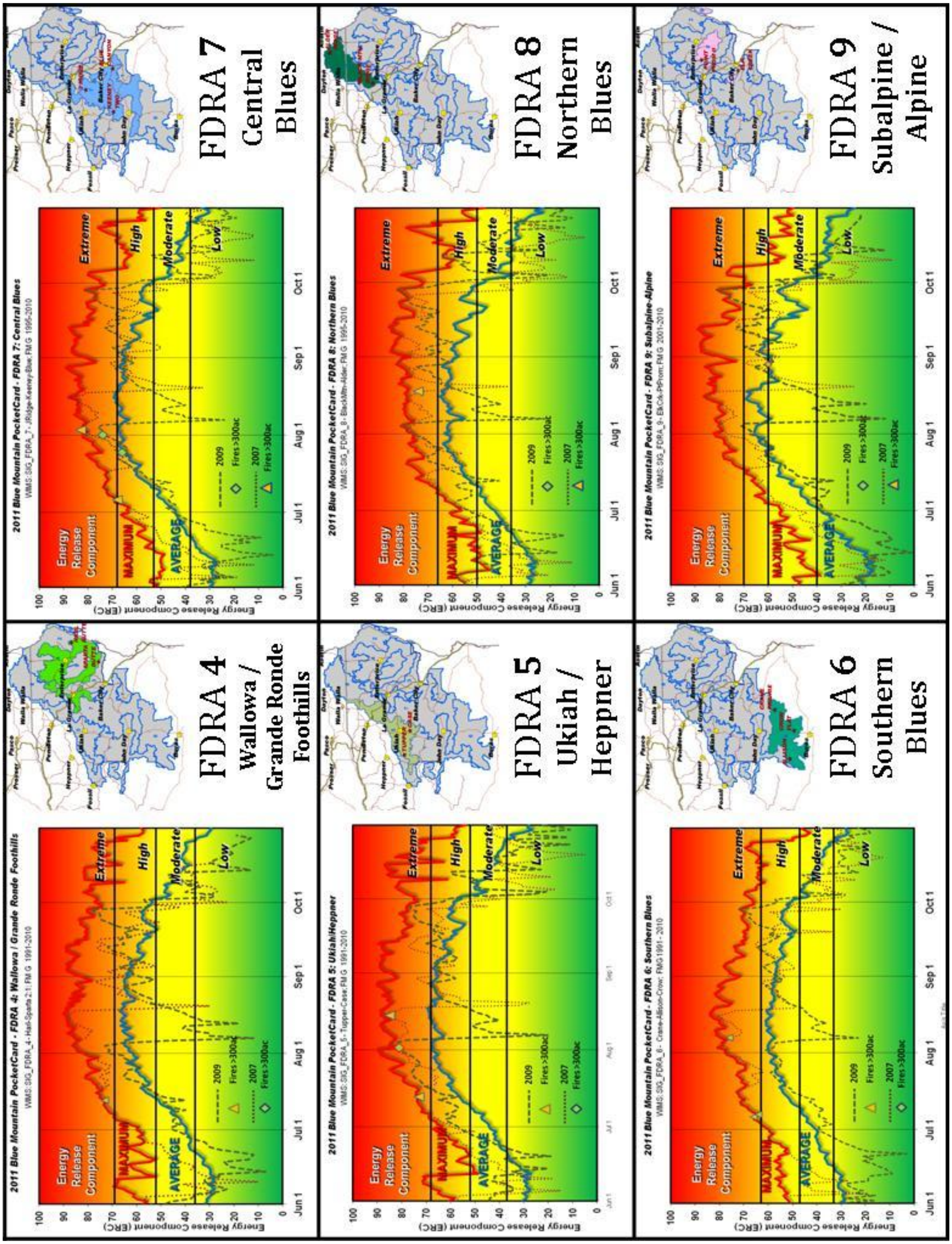
Local Thresholds:

- Winds > 12 MPH
- Temperature > 90
- RH < 20%
- 1000 hr fuels < 11%
- Live Woody FMC < 80%

Watchouts: Red Flag warnings for Very Dry Fuels combined with one of the following:

- **Lightning w/no appreciable precipitation.**
- **Strong Winds combined with Low RH,** including Dry Cold Front passage
- **Dry Unstable Air Mass—Haines Index 5 or 6,** including Surface Thermal Trough Passage

B. PocketCard – Back



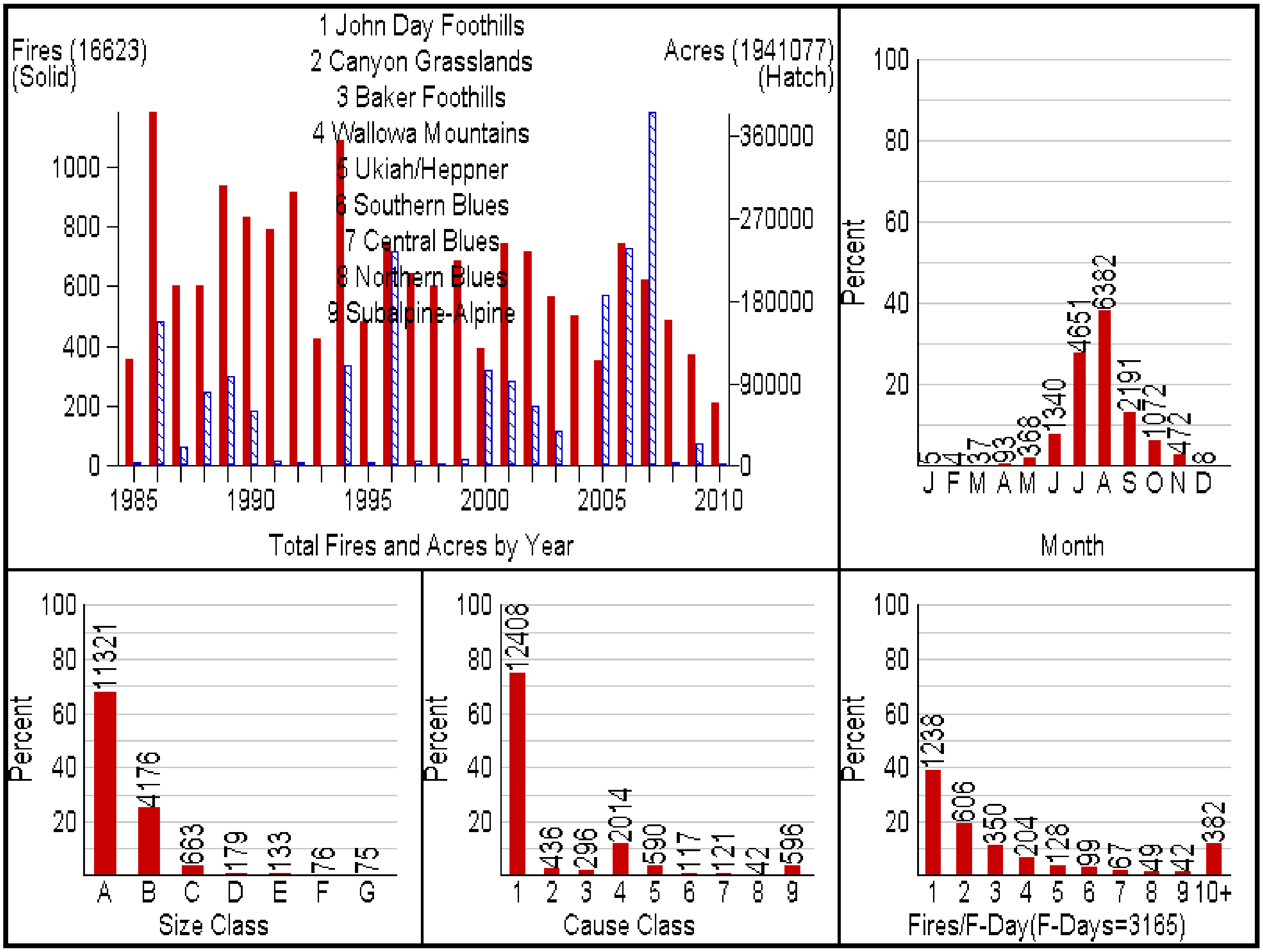
C. NFDRS Tracking Procedures

Download Tracking instructions and Excel workbook at:
ftp://ftp2.fs.fed.us/incoming/wo_fam/Blue_Mtn/2011_BMT_FDOP_Tracking/

Blue Mountain and John Day Interagency Dispatch Centers will post season tracking charts on their websites.

D. Fire History Quality Control Processing

The following table includes all fires for all agencies in the Blue Mountain area for the period 1985 through 2010. Quality control processing is described later in this appendix.



Size Class Table:

Size Class	More Than	Less Than
A	-	0.25
B	0.25	10
C	10	100
D	100	300
E	300	1,000
F	1,000	5,000
G	5,000	

Cause Code Table:

Fire Cause	USFS
LIGHTNING	1
EQUIPMENT USE	2
SMOKING	3
CAMPFIRE	4
DEBRIS BURNING	5
RAILROAD	6
ARSON	7
CHILDREN	8
MISCELLANEOUS	9

FDRA	Description	YEARS	FIRES (All Agencies) 1991-2010 6/1-10/31 All Yrs	6/1-10/31 Acres	C+ Size Class	Fire/Yr	Ac/Fire/Yr
1	John Day Foothills	20	1,642	140,076	159	82	4
2	Canyon Grasslands	20	529	544,215	88	26	51
3	Baker Foothills	--	--	--	--	--	--
4	Wallowa/Grande Ronde Foothills	20	1,435	73,729	66	72	3
5	Ukiah/Heppner	20	1,407	86,797	138	70	3
6	Southern Blues	20	1,763	184,695	48	88	5
7	Central Blues	20	3,116	252,554	110	156	4
8	Northern Blues	20	1,044	171,877	43	52	8
9	Subalpine-Alpine	20	310	49,093	25	16	8
			11,246	1,503,036	677	562	

Blue Mountain Fire Danger Operating Plan
Description of Fire History Quality Control Processing

1/25/2011

Blue Mountain Fire History Data Sources:

Forest Service, corporate fire history point GIS data.

Acquired Fire History from USFS GIS server for CSA4 which is the Blue Mountain Province area. The data consists of fire points corrected for FPA through 2005 plus the KCFAST downloaded corporate GIS format data for 2006 through 2009. Downloaded the GIS reports from KCFAST and updated the layer to include 2010.

Forest Service, fire history data NIFMID

Acquired data from NIFMID, via KCFAST in the .raw format, for the Malheur, Ochoco, Umatilla, and Wallowa-Whitman National Forests. Imported into FireFamily Plus, then exported a shapefile of the data. Reprojected and clipped the data to the FDOP area.

Oregon Department of Forestry (ODF)

Acquired fire history point data from ODF Salem GIS shop as a geodatabase including the years 1962 through 2007. Reprojected, clipped to project area boundary. Removed the years prior to 1985 since those years will not be used in the FDRA analysis, and did not want to deal with quality control of the fire history data that was not going to be used in the analysis. The field FINALSIZE had acres for 1985 through 2005, and 0 acres for 2006 and 2007. The field Size_acres had 0 acres for 1985 through 2005, and had acres for 2006 and 2007. Copied acres from Size_acres for 2006 and 2007 and input into FINALSIZE. Received data for 2008 through 2010 and appended.

Washington Department of Natural Resources (WDNR)

In 2007, acquired fire history point data from internet at: http://fortress.wa.gov/dnr/app1/dataweb/dmmatrix.html In 2011, acquired 2008 through 2010 fire history point data from internet. Reprojected, clipped to project area boundary. Removed fires a significant distance from FDRAs. Crosswalked fire cause to be consistent with USFS fire causes. Fires with discovery dates prior to 1985 were removed so dataset included a fire history of 1985 through 2010.

BLM – Spokane, Burns, Prineville, Vale:

Acquired fire history data from FAMWEB internet site at: http://fam.nwcg.gov/fam-web/weatherfirecd/ Imported the text file into Excel; deleted records that were not "Action Fire" or "Natural Out" based on the FireTypeCode and ProtectionTypeCode and records with start time prior to 1985; added and filled fields for month, day year; saved as a dbf. Added the dbf file to ArcView and created an event layer, reprojecting the data, then clipping to BMT project area. For Prineville, there were a number of "Action Fire" designated records with no control acres, start time and control time were on the same day, so 0.1 acres were entered for control acres.

BIA – Umatilla Agency:

Acquired fire history data from FAMWEB internet site at: http://fam.nwcg.gov/fam-web/weatherfirecd/ Imported the text file into Excel; deleted records with no acres and records with start time prior to 1985; added and filled fields for month, day year; saved as a dbf. Added the dbf file to ArcView and created an event layer, reprojecting the data.

GIS Data Processing:

All of the fire point datasets listed previously were brought into a GIS project, utilizing the same projection (re-projected as necessary), and clipped (as necessary) to the FDOP analysis area. Where more than one dataset was available for a particular agency, the data was reviewed and a decision made as to which dataset would be used in the analysis. Where 2 or more datasets were available, the following datasets were used:

1. BIA, Umatilla Agency – FAMWEB download data.
2. BLM, ALL – FAMWEB download data. (Did not use the PCHA exported data for Vale BLM)
3. Umatilla NF – Corporate server GIS data plus downloaded KCFAST data in .raw format.
4. Wallowa-Whitman NF – Corporate server GIS data plus downloaded KCFAST data in .raw format.
5. Malheur NF –KCFAST downloaded data in .raw format. Did not use the corporate server GIS data because it was missing some years, included some fires that appeared to be other agencies (BLM), and was missing many discovery dates (included years but not date).
6. Ochoco NF – Malheur has protection responsibility for the Snow Mountain Ranger District of the Ochoco National Forest, and that area is included in this FDOP analysis area. The fire history for the Malheur includes fires for the period of analysis for this area, but not as many as expected. The Ochoco fire history includes fires for this area from 1986 through 2000, which are unique from the Malheur fire history, and are therefore included in the analysis.
7. ODF – ODF provided fire history point data.
8. WDNR – WDNR data available for public download from internet.

It is not uncommon for more than one agency to have filled out a fire report for the same fire. Both agencies may have responded, but generally the official fire record should reside in the database of the agency responsible for providing protection at the fire origin. Duplicate records of this nature were common, especially in the earlier years of the period fire records were used in this analysis. Also, final fire perimeters could legitimately be on more than one agencies protection area, therefore the fire could be reported in more than one database. For the analysis, the goal was to have each fire accounted for once, and to make sure each large fire that had occurred was accounted for.

Added X Y coordinates (ArcToolbox, Data Management Tools, Features, Add XY Coordinates) for each record (fire point). The coordinates are for the current projection, this will allow manipulating the data outside of ArcView, and re-creating fire points in the correct location/projection with the manipulated data.

Modified cause codes for non-USFS agencies in accordance with the following crosswalk table:

FIRE CAUSE CODE CROSSWALK BETWEEN DIFFERENT AGENCIES

	USFS	**DOI**	**OR STATE**	**WA STATE**
UNIDENTIFIED		00*	10*	
LIGHTNING	01	01	01	01
EQUIPMENT USE	02	06	03	06*
SMOKING	03	03	05	04
CAMPFIRE	04	02	04*	03*
DEBRIS BURNING	05	04	06	05
RAILROAD	06	07	02	08
ARSON	07	05*	07	02*
CHILDREN	08	08	08*	07
MISCELLANEOUS	09	09	09	09

*Some of the causal terms had to be adjusted to align with other agencies

Created a new table in Access called “BMT_FDOP_FireHx” with the structure and information to be imported into FireFamily Plus. Created queries to write the appropriate data to the common table from each of the attribute tables. In most cases, each query was unique, some linked more than one data source in order to get the most complete final set of records.

Exported the BMT_FireHx table from Access to Excel, then saved it as a .csv file. Imported the file into GIS by adding x,y data, saved as a shapefile. Deleted 1,590 records that were greater than 1 miles from any of the FDRAs, and less than 1,000 acres. Deleted 53 records that were more than 5 miles away and 1,000 acres or greater, all were BLM fires. Deleted 103 records that were within 1 mile but less than 1 acre.

Sorted the table in several ways, highlighted fires that appeared to be similar. If the fires were in the same location, selected one to delete. Tried to base the fire to keep on the ownership of origin.

E. Weather Data Quality Control Processing

Blue Mountain Fire Danger Operating Plan

RAWS data Quality Control Narrative

The following report describes the results of utilizing a method, developed in Microsoft Access 2000, for an individual to build a quality control (QC) weather dataset in the latest data format designed for use with wildland fire analysis software. This process is intended to provide the least erroneous and most consistent quality data available for historical analysis of weather data as it relates to wildland fire.

The process requires acquiring historical weather data from the Western Region Climate Center (WRCC) and from the National Interagency Fire Management Integrated Database (NIFMID). Remote Automated Weather Stations (RAWS) record hourly weather readings consisting of at least: Temperature, Relative Humidity, Wind Speed, Wind Azimuth, and Precipitation (Cumulative). The RAWS data is transmitted initially via satellite, then through a complex network where a Date/Time are added, and is finally stored in at least two locations, WRCC and NIFMID.

RAWS data stored at the WRCC begins from about 1985-86, when the move was made from RAWS transmitting data via modem to satellite transmission, and is essentially in the same format as transmitted. NIFMID stores data processed through the Weather Information Management System (WIMS) where a 24-hour minimum and maximum for temperature and relative humidity is calculated, and the cumulative precipitation is converted into a 24-hour precipitation duration and precipitation amount. NIFMID stores the WIMS processed RAWS data in two different formats.

The NIFMID 1972 data format has an “fwx” file extension, it is non-Y2k compliant (years stored in 2 digits), and consists of one reading per day called an observation. The observation was set manually by an individual going into the WIMS and changing the Type field for a particular record from an “R” to an “O” and entering a value for State of Weather (SOW). Historically, after 18 months, the observation readings were moved to and stored in NIFMID, all readings that didn’t include an observation were not maintained. The 1972 data format does not include the time for that particular reading.

The NIFMID 1998 data format (W98) has an “fw9” file extension and was designed to replace the 1972 data format and provide for the future uses of fire weather analysis. W98 format stores hourly data, is Y2k compliant, and the format includes a field for Solar Radiation (new required instrument for RAWS). Because the W98 format stores hourly data, all of the readings are stored, not just the manually triggered observation. NIFMID has available weather data in the W98 format beginning about April 1993, although from 1993 to about 6/15/2001 data is observations only, and hourly data from about 6/15/2001 to date. There is not generally enough data stored in the W98 format to do a quality historical fire weather analysis, therefore it is necessary to use the 1972 format to obtain the earlier years.

The quality control (QC) weather data process:

- Begins with the basic WRCC RAWS data.
- Conducts an automated deletion of impossible readings and flagging of unlikely readings based on specific criteria.
- Allows manual checking flagged, unlikely readings, and deleting of erroneous readings when appropriate.

- Estimates values under specific conditions by filling or linear interpolation, ensuring not to create new data, but to fill gaps with a known beginning and ending.
- Builds 24-hour summaries such as minimum and maximum values.
- Selects observations consistently at the correct hour first, and then to ensure the most complete dataset with one observation per day where reasonably available.
- Transferring manually entered State of Weather (SOW) where available from NIFMID datasets and estimating when not.
- Exporting a dataset conforming to the 1998 data format (W98).
- The final product includes two datasets, one including hourly records and the other with just daily observations, both directly importable into current fire analysis software. The resulting Access database allows tracing back to the source each individual field for each individual record. Documentation reports available include: summary reports describing the number of fields and percentages of the entire dataset affected by the QC process, comparisons between the QC weather data and with NIFMID products identifying general differences and similarities, and documentation of the program steps.

Weather data from RAWS in the Blue Mountain area was built using a custom Access database, quality control process, developed by Brian Goff. The following table is the summary of the stations analyzed and narrative of the highlights.

	Station Information			Evaluation of Data resulting from Quality Control (QC) process				
	Station#	**Station Name**	**Elev**	**WRCC**	**QC**	**QC WEATHER DATA COMMENTS**	**1300**	**Missing Obs**
1	101100	PITTSBURG LND	1,398	1993-2006	YES	Corrected numerous observations from improper hour. Mostly missing 1993, 2000, first half of 1997, and last half of 1995 and 2002	99%	18%
2	351202	TUPPER	4,270	1986-2007	YES	Scattered missing days, wind speed data generally low (site?). Numerous corrections, generally good data.	99%	8%
3	351319	BLACK MTN RDG	5,275	1995-2007	YES	Linked previous stations 351314 (1995-1998), to 351317 (1997-2007), to 351319 (2008 -). Missing Jun-Jul 1996, and Aug-Sep 2007. Historical station locations not good for wind readings.	99%	12%
4	351414	J RIDGE	5,066	1986-2006	YES	Corrected numerous observations from improper hour. Mostly missing 1986. Many Temp sensor errors 2002. Some corrections, generally good data.	99%	4%
5	351416	MINAM LODGE	3,596	1986-2007	NO	NOT UTILIZED		
6	351417	LaGRANDE 1	3,146	1997-2006	NO	NOT UTILIZED		
7	351419	POINT PROM II	6,552	2000-2006	YES	Corrected numerous observations from improper hour. Missing June and half of July in 2000 and 2004. Wind readings generally low (site?). RH readings generally lower than expected.	99%	7%
8	351502	HARL BUTTE	4,685	1991-2006	YES	Corrected many observations from improper hour. WRCC data available only since 1991 for QC, WIMS data since 1986. Missing June and July 1991. Numerous corrections, generally good data.	99%	9%
9	351518	EDEN	3,460	1990-2007	YES	Numerous corrections, generally good data.	99%	7%
10	351520	ROBERTS BUTTE	4,304	1999-2006	YES	Corrected many observations from improper hour. Eliminated numerous erroneous wind speed readings. Generally good data.	100%	1%
11	352124	YELLOWPINE	4,656	2000-2006	YES	Corrected many observations from improper hour. Generally good data.	99%	0%
12	352126	ELK CREEK	4,754	2000-2006	YES	Corrected many observations from improper hour. Generally good data.	99%	1%
13	352209	MITCHELL		2003-2006	NO	NOT UTILIZED		
14	352305	CRANE PRAIRIE	5,541	1986-2006	YES	Deleted years 1986 - 1989 due to bad data. Numerous corrections, generally good data.	98%	3%
15	352327	FALL MTN	5,876	1986-2006	NO	NOT UTILIZED		
16	352329	CASE	3,910	1986-2007	YES	Numerous corrections, especially Precip during 1997, generally good data.	99%	6%
17	352330	BOARD CREEK	4,498	1986-2007	YES	Mostly missing 1986. Corrected many observations from improper hour. Generally good data.	99%	3%
18	352332	KEENEY 2	5,098	1995-2006	YES	Mostly missing 1995. Generally good data.	99%	3%
19	352416	BLUE CANYON	3,960	1986-2006	YES	Mostly missing 1986. Corrected many observations from improper hour. Generally good data.	98%	4%
20	352418	SPARTA BUTTE	4,212	1989-2006	YES	Corrected many observations from improper hour. Numerous corrections, generally good data.	98%	4%
21	353501	ALLISON	5,320	1986-2006	YES	Numerous corrections, generally good data.	99%	3%
22	353515	CROW FLAT	5,130	1986-2006	YES	Numerous corrections, generally good data.	99%	4%
23	353524	ANTELOPE	5,905	1994-2006	YES	Numerous corrections, capable of recording high wind speeds, generally good data.	99%	5%
24	453803	ALDER RIDGE	4,565	1986-2007	YES	Numerous corrections, especially Precip 1998 - 2000. Capable of recording high wind speeds, generally good data.	98%	6%

F. FireFamily Plus Analysis

Following is a table of all of the weather station/SIGs analyzed. Highlighted stations/SIGs in the table were selected as the best fit for making fire danger based decisions. The selected station/SIG did not always have the highest statistical correlation in every statistical test, but they generally had good correlation among the candidates tested. The index and fuel model selection tended to have consistent good correlation across all of the FDRAs, and they represent the FDRA.

#	MODEL	FDRA	Sta # / SIG Sta	Station / SIG	Years	# Yrs	#FD	LFD	#LFD	MFD	#MFD	Run by
		1	351202	TUPPER	1991-2010	20	653	100	52	3	160	Dennis P
1	G	1	352330	BOARD CREEK	1991-2010	20	662	100	54	3	163	Dennis P
		1	SIG - FDRA_1	Tupper-Board Creek	1991-2010	20	662	100	54	3	163	Dennis P
		2	101100	PITTSBURG LND	1994-2010	17	221	100	29	3	35	Dennis P
		2	351518	EDEN	1991-2010	20	293	100	35	3	54	Dennis P
		2	351520	ROBERTS BUTTE	1999-2010	12	164	100	23	3	26	Dennis P
		2	SIG - FDRA2a	Eden-Roberts	1999-2010	12	164	100	23	3	26	Dennis P
1	G	2	SIIG - FDRA2b	Harl-Eden **1:2**	1991-2010	20	295	100	35	3	54	Dennis P
		3	352124	YELLOWPINE	2001-2010	10	20	1	8	2	1	Dennis P
		3	352418	SPARTA BUTTE	1991-2010	20	54	1	27	2	4	Dennis P
		3	SIG - FDRA_3	Yellowpine-Sparta	2001-2010	10	20	1	8	2	1	Dennis P
		4	351502	HARL BUTTE	1991-2010	20	684	5	70	3	118	Dennis P
		4	351518	EDEN	1991-2010	20	682	5	70	3	119	Dennis P
		4	351520	ROBERTS BUTTE	1999-2010	12	392	5	38	3	66	Dennis P
		4	352418	SPARTA BUTTE	1991-2010	20	697	5	70	3	121	Dennis P
		4	SIG - FDRA_4a	Harl-Sparta	1991-2010	20	702	5	72	3	121	Dennis P
		4	SIG - FDRA_4b	Harl-Eden-Sparta	1991-2010	20	704	5	72	3	121	Dennis P
		4	SIG - FDRA_4c	Eden-Sparta	1991-2010	20	704	5	72	3	121	Dennis P
		4	SIG - FDRA_4d	Roberts-Sparta **1.5:1**	1999-2010	12	392	5	38	3	66	Dennis P
		4	SIG - FDRA_4e	Harl-Roberts	1999-2010	12	392	5	38	3	66	Dennis P
1	G	4	SIG - FDRA_4f	Harl-Sparta **2:1**	1991-2010	20	702	5	72	3	121	Dennis P
		5	351202	TUPPER	1991-2010	20	630	5	129	3	128	Dennis P
		5	352329	CASE	1991-2010	20	632	5	132	3	129	Dennis P
1	G	5	SIG - FDRA_5	Tupper-Case	1991-2010	20	639	5	132	3	129	Dennis P
		6	352305	CRANE PRAIRIE	1991-2010	20	654	5	64	3	178	Dennis P
		6	353501	ALLISON	1991-2010	20	652	5	64	3	177	Dennis P
		6	353515	CROW FLAT	1991-2010	20	654	5	64	3	178	Dennis P
		6	353524	ANTELOPE	1994-2010	17	532	5	54	3	144	Dennis P
		6	SIG - FDRA_6a	Crane-Allison	1991-2010	20	654	5	64	3	178	Dennis P
		6	SIG - FDRA_6b	Crane-Crow	1991-2010	20	654	5	64	3	178	Dennis P
		6	SIG - FDRA_6c	Allison-Crow	1991-2010	20	654	5	64	3	178	Dennis P
1	G	6	SIG - FDRA_6d	Crane-Allison-Crow	1991-2010	20	654	5	64	3	178	Dennis P
		6	SIG - FDRA_6e	all 4 stations	1991-2010	20	654	5	64	3	178	Dennis P
		7	351414	JRidge	1991-2010	20	1022	5	120	3	289	Dennis P
		7	352305	CRANE PRAIRIE	1991-2010	20	1026	5	121	3	291	Dennis P
		7	352332	KEENEY 2	1995-2010	16	778	5	98	3	210	Dennis P
		7	352416	BLUE CANYON	1991-2010	20	1009	5	120	3	289	Dennis P
		7	SIG - FDRA_7a	all 4 stations	1991-2010	20	1026	5	121	3	291	Dennis P
		7	SIG - FDRA_7b	Jridge-Crane-Blue	1991-2010	20	1026	5	121	3	291	Dennis P
		7	SIG - FDRA_7c	Jridge-Crane	1991-2010	20	1026	5	121	3	291	Dennis P
		7	SIG - FDRA_7d	Crane-Blue	1991-2010	20	1026	5	121	3	291	Dennis P
1	G	7	SIG - FDRA_7e	Jridge-Keeney-Blue	1995-2010	16	810	5	104	3	219	Dennis P
		8	351317	BLACK MTN 2	1995-2010	16	335	5	32	3	55	Dennis P
		8	453803	ALDER RIDGE	1991-2010	20	487	5	49	3	82	Dennis P
1	G	8	SIG - FDRA_8	Black-Alder	1995-2010	16	356	5	35	3	58	Dennis P
		8	SIG - FDRA_8a	Black-Alder **1:2**	1995-2010	16	356	1	79	3	58	Dennis P
		9	351419	POINT PROM II	2001-2010	10	95	1	27	2	26	Dennis P
		9	352126	ELK CREEK	2001-2010	10	104	1	29	2	27	Dennis P
1	G	9	SIG - FDRA_9	ElkCrk-PtProm	2001-2010	10	104	1	29	2	27	Dennis P
all runs include Temp, RH, FM10, FM100, FM1000, ERC, BI, SC, IC in FM: C, G, H, K, T, U												

G. RAWS Network

STA ID	Name	Agency/ Unit/Disp	NESDIS ID	FDRA	PSA	FWZ	CWA	Lat/Long	T/R/S	Elev	Aspect/ Site
351202	Tupper	FS_UMF JDIDC	3245D76E	1 & 5	N/A	632	OR503	45° 04' 15" 119° 29' 24"	T6S/R27E SEC 04	4000'	South/ Mid Slope
352329	Case	FS_UMF BMIDC	3245F182	5	E4	632	OR503	44° 58' 16" 118° 55' 47"	T7S/R31E SEC 12	3800"	South/ Mid Slope
453803	Alder Ridge	FS_UMF BMIDC	3245E2F4	8	E4	633	N/A	46° 16' 24" 117° 29' 42"	T9N/R42E SEC 12	4500"	South/ Mid Slope
351518	Eden	FS_UMF BMIDC	3246157E	2 & 4	N/A	633	OR502	45° 55' 36" 117° 35' 18"	T5N/R42E SEC 08	4000"	South/ Mid Slope
351319	Black Mtn Ridge	FS_UMF BMIDC	327F70B4	8	N/A	633	N/A	45° 34' 26" 118° 14' 18"	T1N/R37E SEC 07	4965"	South/ Ridge
351318	Umatilla Portable 1	FS_UMF	328E06CA	N/A	N/A	N/A	N/A	P	P	P	P
352332	Keeney 2	FS_MAF JDIDC	326C6352	7	N/A	632	OR503	44° 39' 58" 118° 55' 15"	T10S/R32E SEC 30	5120"	South/ Ridge
352327	Fall Mtn	FS_MAF JDIDC	3262F258	N/A	E4	632	OR506	44° 17' 38" 119° 02' 31"	T15S/R31E SEC 06	5949"	South/ Ridge
352305	Crane Prairie	FS_MAF JDIDC	32622430	6 & 7	N/A	632	OR506	44° 10' 00" 118° 28' 00"	T16S/R35E SEC 29	5373"	South/ Valley
353515	Crow Flat	FS_MAF BICC	326241D6	6	N/A	632	OR061	43° 50' 00" 118° 56' 00"	T20S/R32E SEC 18	5130"	West/ Valley
353501	Allison	FS_MAF BICC	326021C4	6	N/A	632	OR061	43° 55' 12" 119° 34' 47"	T19S/R26E SEC 15	5320"	South/ Valley
353524	Antelope	FS_MAF JDIDC	32652604	6	E5	632	OR506	44° 02' 43" 118° 24' 59"	T17S/R35E SEC 33	6460"	Southwest/ Ridge
352330	Board Creek	FS_MAF JDIDC	325D4134	1	N/A	632	OR503	44° 35' 36" 119° 16' 40"	T11S/R29E SEC 19	5000'	Flat/ Ridge
351419	Point Prom II	FS_WWF BMIDC	326B7210	9	N/A	634	N/A	45° 21' 17" 117° 42' 16"	T2S/R41E SEC 29	6607'	West/ Ridge
101100	Pittsburg Landing	FS_WWF BMIDC	837035B8	2	N/A	102	N/A	45° 38' 17" 116° 28' 11"	T27N/R1W SEC 33	1150'	East/ Valley
352126	Elk Creek	FS_WWF BMIDC	323EB48C	9	N/A	638	OR062	44° 45' 28" 117° 58' 16"	T9S/R39E SEC 29	6576'	West/ Midslope
352124	Yellowpine	FS_WWF BMIDC	323E9260	3	N/A	638	N/A	44° 41' 35" 118° 19' 23"	T10S/R36E SEC 17	4200'	Missing from WIMS
352418	Sparta Butte	FS_WWF BMIDC	3234E5A2	3 & 4	E4	638	OR062	44° 54' 30" 117° 22' 30"	T7S/R44E SEC 31	4278'	South/ Midslope

STA ID	Name	Agency/ Unit/Disp	NESDIS ID	FDRA	PSA	FWZ	CWA	Lat/Long	T/R/S	Elev	Aspect/ Site
352416	Blue Canyon	FS_WWF BMIDC	325DA2C6	7	E4	638	OR062	44° 40’ 00” 117° 56’ 00”	T10S/R39E SEC 28	4200’	Southwest/ Midslope
351416	Minam Lodge	FS_WWF BMIDC	3237C440	N/A	N/A	634	OR050	45° 21’ 04” 117° 38’ 01”	T2S/R41E SEC 36	3589’	Flat/ Valley
351414	J Ridge	FS_WWF BMIDC	3262673A	7	N/A	633	OR503	45° 06’ 50” 118° 24’ 14”	T5S/R35E SEC 23	5180’	Southeast/ Midslope
351502	Harl Butte	FS_WWF BMIDC	3262B152	4	E4	635	OR050	45° 19’ 09” 116° 52’ 03”	T3S/R48E SEC 07	6071’	West/ Ridge
351520	Roberts Butte	FS_WWF BMIDC	3234D038	2 & 4	E4	635	OR050	45° 40’ 54” 117° 21’ 23”	T2N/R44E SEC 06	4263’	Southwest/ Ridge